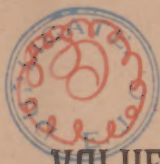


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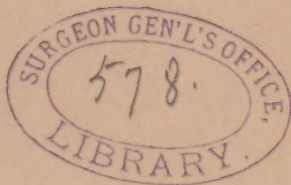


VALUE OF ELECTRICITY IN MINOR
GYNECOLOGY.

BY

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BOSTON.

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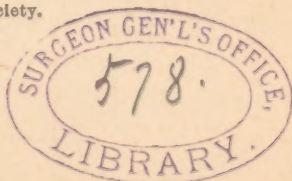
ON THE VALUE OF ELECTRICITY IN MINOR GYNECOLOGY.¹

BY EDWARD REYNOLDS, M.D., BOSTON.

THE current literature of the day is constantly occupied with statements and counter-statements of the value and the worthlessness of electro-therapeutics in gynecology; but, in looking over the statements which are made upon one side and the other, I think it will be found that there is a marked difference between its advocates and opponents, in that all the former speak of its use in definite terms by differing methods of application, and with the use of different currents; while the majority of the latter condemn the use of electricity undefined, usually speaking of it as dangerous and painful. I cannot but believe that this difference of method indicates the reason for the difference of opinion; that is, that those whose experience has been unfavorable are, for the most part, men who have attempted the use of an agent as powerful for good and evil as perhaps any other in general use in medicine, without a sufficient preliminary study of the natural laws which govern its production, and of the natural history of the effects of the different currents upon the human tissues.

Since the different varieties of the electric current produce almost exactly opposite effects upon the tissues, one current stimulating, another soothing, a third encouraging, and yet another controlling hæmorrhage, it is almost self-evident that their indiscriminate use must sooner or later be attended by considerable danger and severe pain.

¹ Read before the Fall River Medical Society.



Personally, I do not rank myself among the most enthusiastic advocates of the use of the current for each and every gynecological trouble, but I certainly wish to be regarded as one of those who believe it to be a most valuable agent in a large proportion of cases, holding it as I do to be, upon the whole, more frequently valuable than any one of our other conservative agents. I should feel that if I were obliged to give up some one of the methods which I habitually pursue in office practice, I should more readily abandon the use of the glycerine tampon, tincture of iodine, tamponade of the vagina, or massage of the uterus and its adnexa, than to lay aside my battery.

In this paper, it is my object to describe a simple armamentarium, with which it seems to me that most cases can be treated, in the absence of more elaborate preparations for the use of the current; to state briefly the amount and kind of electrical knowledge which I think essential to success in gynecological therapeutics, together with the technique of the applications; and, finally, to speak briefly of a few of the pathological conditions which are most uniformly benefited in this way, noticing in passing the indications and contraindications for the current in each case, and occasionally giving a brief outline of a specimen case.

The greater the knowledge of electrical physics which the physician possesses, the more sure is he to apply it to the needs of his patients with intelligence and skill, and to contribute to the progress of medical science; but for practical purposes comparatively little will suffice. He who thoroughly understands and can apply Ohm's law, that, the electro-motive force is equal to the potential divided by the resistance, together with its numerous corollaries, knows all that is absolutely necessary for the comprehension of electro-therapeutics: but in making such a statement, I wish to em-

phasize the fact that he must possess this law and its corollaries with the utmost thoroughness, with the most complete understanding, and not by a mere mechanical effort of the memory. Such a knowledge can be acquired by any educated man with but a comparatively few hours' study of any of the more ordinary electrical text-books.

When once equipped with this knowledge, the physician must further acquire a clear understanding of the effects of the galvanic and faradic currents upon the human tissues, and must learn the modifications of their action which are produced by the use of one or the other pole as the active electrode, by the form of electrode employed, and by the degree of tension, or potential, of the current.

The situation and character of the organs with which we, as gynecologists, deal, enables us to use much more powerful galvanic currents than are within the reach of other electro-theraputists. The insensitive condition of the mucous membranes, their separation from the skin of the abdominal wall by but a few inches of tissue, and the large expanse of surface which is there offered for the application of the dispersing electrode, are advantages enjoyed by no other body of specialists.

ARMAMENTARIUM.

If we except the use of electricity for the destruction of fibroid tumors and other new growths, we, however, seldom need to employ a galvanic current of more than from 80 to 120 milliampères; and for ordinary office use, a battery with a maximum potential of 40 volts is usually sufficient. Any battery which is convenient, and furnishes a tolerably stable current, may be used for the purpose; but it may be remarked that the latter requisite implies necessarily the use of fairly large

cells, since the resistances in gynecological work are so low that the portable chloride of silver and other small cells are exhausted with extreme rapidity. I have, myself, used for some years with satisfaction, a twenty-cell bichromate of potash battery, for the generation of the galvanic current.

In order to obtain the full benefit which it is possible to derive from the faradic current, it is necessary to possess a battery which is furnished with two induction coils, one composed of coarse, and the other of fine wire, and which is also possessed of several interruptors of varying rapidity, such as that devised by Dr. Engelmann, of St. Louis. Then, in addition to the batteries, it is necessary that the physician should supply himself with a reliable milliampère-meter; it is highly desirable that he should possess a rheostat, or current controller; and finally, his outfit should include a set of flexible abdominal electrodes of various sizes, and a number of others for vaginal and intra-uterine use.

For the negative, or dispersing pole, upon the abdominal wall, the wire gauze instruments now commonly sold have seemed to me as valuable as any, and more convenient than most. I have them covered upon one side with a thick layer of absorbent cotton and a single thickness of cotton cloth, upon the other with oiled silk. For the active pole, a vaginal electrode of a size which permits the metallic surface to be thickly covered with clay or absorbent cotton, a set of olive-tipped intra-uterine bougies with insulated stems, an intra-uterine electrode insulated to within two inches of its tip, and shaped like the common applicator, to be wrapped with cotton, and one whose last two inches are of the shape and proportion of the ordinary uterine sound, are all that are strictly necessary; though the possession of a large metallic vaginal electrode, and

one for bi-polar intra-uterine use, is occasionally an advantage. The entire outfit may probably be purchased for about one hundred dollars.

The technique of the application is simple. The patient should be placed in the ordinary dorsal position. It is unnecessary to remove or even loosen any of her clothing, unless an unusually powerful current is to be employed, since the smaller sizes of abdominal electrodes which are used with mild and medium currents can easily be slipped under the clothing from between the thighs.

The abdominal electrode, if not already prepared, should be covered with a clean piece of absorbent cotton of from one quarter to half an inch in thickness, when wet. This should be dipped in very hot water, and the superfluous fluid expressed until its moisture is just such that the water will not drip from it and wet the patient's clothing. It should be carefully arranged upon the electrode in such a way that the edges and angles are fully protected, placed upon the abdomen while still warm, and allowed to remain there during the few minutes that will be occupied by preparing and testing the battery; the object of this preliminary placing of the abdominal electrode being to permit the dried epidermis to become thoroughly moistened, thus greatly lessening its resistance. The battery and milliampère-meter should then be connected, and the connections tested by passing a weak current through the resistance of the rheostat, in order to see that everything is in working order. The vagina should be exposed by a speculum, and disinfected with the utmost care. If an intra-uterine electrode is to be used, it should be introduced with the utmost gentleness, any abrasion of the mucous membrane being certain to be followed by local cauterization; and should be allowed to remain in position, unconnected with the

battery, until the sensations due to its passage have been forgotten.

The connection with the electrode should then be made while the battery is shut off from the circuit. The current should be turned on so gradually that the patient receives no shock, that being a phenomenon which is only experienced from an abrupt change in the electro-motive force. When the patient first begins to complain of uncomfortable sensations, the current should be checked, maintained at that height for from two to five minutes, and as gradually decreased; great care being taken that the connections are not broken until the battery has been wholly shut off from the circuit.

In administering the galvanic current, its strength may be increased by either one of two methods; the choice depending upon the variety of current which is desired. When the current of low tension is used, its increase is secured by the gradual addition of new cells to the circuit, by means of the cell collector. When the case requires a current of high tension, the whole resistance of the rheostat is at first included in the circuit. The force of the battery is then gradually turned on by the cell collector, until the desired effect has been secured; or until its whole electro-motive force is in use. In the latter case, the current is again decreased by gradual diminution of the resistance of the rheostat.

ACTION OF THE DIFFERENT CURRENTS.

Before proceeding to the discussion of the various conditions in which electricity is of use in gynecology, it is necessary to define briefly the effect of the different currents, and to speak of the contra-indications to their use.

The Galvanic Current.—The galvanic current of

high tension is that which is produced by a large number of cells and then reduced to the amount desired by the interposition of a high resistance. The galvanic current of low tension, or of quantity, is that produced by a small number of cells acting through a low resistance. The first excels in power of cauterization, the second in electrolytic action. Cauterization is most marked when a metallic electrode is used, electrolysis when it is moist and non-metallic.

When the negative current of low tension is used with a non-metallic electrode, its action is almost wholly limited to intra-polar electrolysis; that is, the stimulation of retrograde metamorphosis and the partial reduction of the interposing tissues into the ordinary products of such metamorphosis. The lowly organized tissues, such as the pelvic exudates, are much more actively affected by this process than the more highly developed, normal tissues. The effect upon the mucous membrane which is in contact with the electrode, is in this application reduced to its minimum.

When the negative current of high tension is used with a metallic electrode, much less electrolysis of the intra-polar tissues is to be expected; but the tissues in contact with the electrode are likely to be somewhat extensively cauterized. The use of the negative pole as the active pole, in general, tends to the increase of hæmorrhage, and is perhaps more likely to increase than decrease pelvic pain, at least for the few days which immediately succeed its use. It may often be advantageously combined with the sedative action of the faradic current of high tension.

The positive current of low tension with the non-metallic electrode is somewhat sedative in its effect and may be used for electrolysis; but it is mainly useful for the decrease of any hæmorrhagic tendency,

since it has no other advantage over the corresponding negative current and its use necessitates the application of the more painful negative pole to the sensitive abdominal wall.

The positive current of high tension with a metallic electrode is a highly effective chemical cautery which is attended by but little pain, and tends to decrease hæmorrhage. Its advantages over other forms of cauterization are due to the fact that while when properly used its effect is limited to the mucous membrane, it tends from simple laws of electrical conduction to extend itself to the whole of the mucous surface, even including the recesses of the crypts, an advantage which can be claimed for no other caustic.

The positive current as a whole tends to decrease hæmorrhage and relieve pain.

The Faradic Current. — The faradic current of high tension is that produced by an induction coil made up of many turns of fine wire, while the faradic current of low tension is produced by a coil which contains but a few turns of coarse wire. The effects of both varieties of current are much modified by the number of interruptions per minute which is employed.

The faradic current of high tension with many interruptions to the minute, is perhaps more potent in alleviating pelvic pain than any other therapeutic agent which we possess. It has but little other effect. The faradic current of tension with few interruptions produces less marked relief of pain. It has a decided tendency to render the tissues anæmic, and is therefore often of value.

The faradic current of quantity, or low tension, is a sharp stimulant, and promotes contraction of both striped and unstriped muscular fibres, and thus relieves congestion and engorgement by hastening the current in the veins and lymphatics of the tissues through

which it passes. Its effect is intensified by any reduction of the number of interruptions to the minute.

CONTRA-INDICATIONS TO ELECTRICITY.

Any acute inflammatory condition in the pelvis contra-indicates the use of electricity and must be most carefully excluded before the current is applied. The faradic current of tension has been recommended for use in acute pelvic inflammations. I have not myself as yet had sufficient courage to undertake its application, but have preferred to trust to slower, and, it seems to me, less dangerous methods; and indeed, am even accustomed to restrict myself to the less active of subacute cases.

The presence of pus in the pelvis, and of tubes whose uterine ends are occluded, is a contra-indication for any use of electricity, except electro-puncture, which I have never attempted and can say nothing about; believing as I do that where drainage is necessary, the use of the knife is the preferable procedure.

When much tenderness is present, the early applications should be restricted to the faradic current of tension. As this grows less, gentle galvanic currents may be resorted to, preferably in combination with it. The faradic current of low tension should never be used in the presence of inflamed tissues.

INDICATIONS.

It can be readily seen that the use of so many and such different agents as the various electric currents, either alone or in combination, opens up a field of such complexity that its complete discussion might well occupy a volume; and it seems to me that the only method by which discussion can be profitably elicited by a single brief paper, is the description of the methods

employed in a few given affections, and a brief report of typical cases.

CONGESTION OF THE PELVIC ORGANS AND STENOSIS OF THE INTERNAL OS.

CASE I. Mrs. X., thirty years old, came to my office with the following history:

Her menstruation had always been irregular. She had been married six years, and had never been pregnant. Had always been liable to dysmenorrhœa, which had, however, increased greatly since marriage, and of late was becoming rapidly worse. Connection was frequent, but not improperly so. Physical examination demonstrated the presence of moderately well-marked anteflexion of the cervix, and intense congestion of all the pelvic organs. She had not seen her catamenia for nearly three months, and was complaining, as was usual at such times, of heat, discomfort, and bearing-down sensations, referred to the pelvis. There was no pelvic tenderness. She was given the negative galvanic current of low tension, with a non-metallic intra-uterine electrode, for ten minutes, and was directed to use four quarts of the hottest water bearable, under a hydrostatic force of three feet, twice daily.

At the end of two weeks, she returned, and reported that within three days she had menstruated more freely than for some years, and with but little pain. The same application was made and she was directed to continue the use of hot water; to insert a glycerine tampon after each injection, and return before the next catamenial period. The congestion of the vagina and cervix was greatly decreased. Feeling much better, she neglected to report until after the next period; but as this was less free and much more painful, in spite of the persistent use of hot water and glycerine,

she returned for another application of the current. Her next period was preceded by a fourth application of the same character, and was free and painless. She then left town for the summer. On her return in the autumn, she reported that she had continued well, and had now no complaint to make, except of her sterility, which appeared to me to be due to a stenosis of the internal os, caused by the sharp bend in the canal. The posterior cul-de-sac was deep, the external os was not directed forward to any unusual degree, and I believed that if the canal were freely patulous, conception would follow, and the permanency of the cure would be assured.

In this belief, I applied the negative galvanic current of 20 to 25 milliamperes through an intra-uterine sound electrode (metallic) for five minutes; and this application was repeated four times; the first three at intervals of from five to seven days; the last after an interval of three weeks, due to her failure to report sooner.

This application was made October 31, 1891. She has not menstruated since, and from repeated vaginal examinations I have now every reason to believe that she is about three months' pregnant.

This case illustrates both the action of the faradic current of low tension in stimulating the functions of the uterus and the activity of the pelvic circulation, and also the electrolytic action of the negative galvanic current; it being plainly evident that each succeeding passage of the sound through the internal os was easier and less painful than that which had preceded it. The metallic electrode was used in accordance with my belief that the stenosis was partly due to a congestion and hypertrophy of the mucous membrane which would be best relieved by cauterization.

CHRONIC SUB-INVOLUTION OF THE UTERUS AND ITS
LIGAMENTS.

CASE II. Mrs. B., thirty-seven years old, married sixteen years, the mother of six children, complains of a dragging sensation, great nervousness, unexplained crying spells, inability to leave the house alone. Physical examination resulted as follows: Moderate laceration of the pelvic floor, deep bi-lateral laceration of the cervix, its lips enlarged and everted; uterus large, soft, and low in the pelvis, freely movable; both ovaries large, heavy, and somewhat low; tubes normal. No pelvic tenderness. The faradic current of low tension was applied, at first through a vaginal, later through an intra-uterine non-metallic electrode, in sittings of six to ten minutes, repeated every week. The uterus was supported by a suitable pessary. The patient was recommended an operation for the repair of the cervix and perineum, but told that better results would follow if she submitted to some weeks or months of preparatory treatment by electricity.

At the end of four months, the uterine body was of normal size, the cervix much smaller and less everted: the ovaries were as a rule in normal position, though subject to prolapse when the patient was fatigued; the vagina had decreased in size so greatly that the pessary which she then wore was of about two-thirds the width of that which was at first employed. She was able to go to New York with her husband, and spend the day in shopping, alone, without discomfort, an event of which she spoke to me as, "Something which I never expected to do again." During the summer months which succeeded, she came to town each month for the adjustment of the pessary; but owing to the fatigues of the journey, was not subjected to any electrical treatment. In the autumn, she considered her-

self well, and when told that nothing but the most constant care could insure her remaining in that condition, so long as the lacerations were not repaired, she decided that in view of her improved condition, she would prefer to remain under observation and defer the operation,

She has remained in good health for more than a year, and no longer requires a pessary, but is again considering the question of operation, which is now advisable chiefly on account of the liability of a relapse from want of support.

This case is an illustration of what I consider one of the chief advantages of the faradic current; that of promoting the return of relaxed sub-involutcd organs to their normal size. It is of great value as a preparation for an operation, whenever the condition is due to a lack of support; and in assisting in enabling the patient to dispense with the pessary in cases of retroversion from laxity of the ligaments, where the supports are unimpaired.

PELVIC EFFUSIONS AND DISPLACEMENTS DUE TO CONTRACTED LIGAMENTS.

CASE III. Miss S., single, twenty-six, tailoress, complains of backache and pain in the right groin, running down into the thigh, of about two years' duration. Physical examination shows the uterus to be retroverted and adherent; the right broad ligament shortened, much thickened and very sensitive, especially on motion of the cervix toward the left side. Directed to use glycerine tampons.

At the end of three weeks, the pelvic tenderness was decidedly less; the uterus somewhat more movable. The negative galvanic current was applied, for five minutes, at each visit, through a non-metallic vaginal electrode, with a strength of 20 to 25 milliampères,

increased after a few sittings to between 40 and 45, and was followed at each visit by systematic tamponade of the vagina through a Sim's speculum. At the end of eight weeks the mobility of the uterus had greatly increased; it was in nearly normal position, and the patient was able to tolerate a retroversion pessary, which, with occasional intermissions on account of exacerbations of pelvic tenderness, she has now worn for two years.

This case is a type of those of its class which I have subjected to electrical treatment. If I am unable to report the brilliant successes in the rapid dispersion of large pelvic exudates which some other observers have seen, it is because I have hesitated to apply the current to acute affections, in the belief that success could be as surely and more safely, although certainly more slowly, effected by other means; and also because in more chronic cases I have never as yet trusted to the current alone, but have thought it best to supplement its effects by the other and more familiar methods which are at our disposal.

CHRONIC PELVIC PERITONITIS, PARA- AND PERIMETRITIS, SALPINGITIS AND OVARITIS.

CASE IV. Mrs. M., thirty-eight, mother of five children, two years ago complained of slight pain in the right side soon after the birth of the last child. Was recommended by her physician, without vaginal examination, to apply hot vaginal douches. She used one, and was attacked by severe burning pain in the right groin, for which morphia was administered for several days, and which in less severe form has never left her since. On examination, universal pelvic tenderness, most marked on right side and over uterine body. Faradic current of high tension, with moist vaginal electrode, about 1,500 interruptions to the minute for five min-

utes; used glycerine tampons. One week later, stated that though she still felt some pain, it had been distinctly less from the time of the electrical application. The same current was re-applied; patient not seen since; is reported to have continued well.

This case is an extreme example of the favorable effects of the faradic current of high tension in chronic pelvic tenderness, due to a slight inflammation of one or more of the pelvic organs. In my experience, its influence is usually favorable, but as marked an effect as this cannot always be expected.

ENDOMETRITIS.

CASE V. Mrs. F., forty-five, slight backache, especially when tired, moderate but increasing dismenorrhœa since one year after birth of last child; when during an unusually painful catamenial period, she passed a small oblong body, which, on rough inspection appeared to be an ovum of from a week to ten days' advance in gestation. On microscopical examination by an embryologist, it was declared to be a cast of the uterus from a case of pseudo-membranous dysmenorrhœa. Application of the positive galvanic current, 65 milliamperes strength, from the metallic intra-uterine electrode, for about fifteen minutes; use of hot-water douches recommended; patient not seen again for six months, when she stated that since the application of the electricity, menstruation had been but slightly painful, though it was somewhat more scanty than before, and she had considered herself well. Had used the hot water faithfully during all that time, and was recommended to discontinue it. A large amount of froth had oozed from the external os at the time of the application, and it was felt that a thorough cauterization of the uterine cavity had been made. The patient's menstruation was always some-

what scanty, and it was probably an error of judgment to have used the positive, in place of the negative, current. She did not return for treatment until nearly a year later. At that time she considered herself well, but thought that her dysmenorrhœa was somewhat worse. After six applications of the negative galvanic current, 50 to 60 milliampères of five minutes each, she menstruated much more freely and with less pain than usual, and said that she felt much more cheerful and in better condition than for some years. A metallic intra-uterine electrode was used, in the belief that the dysmenorrhœa was dependent on the existence of endometritis.

CONSTIPATION.

CASE VI. Mrs. F., sixty-three, pelvic organs senile, complains of pain in back. This was thought to be due to shortened sacro-uterine ligaments and constipation. Vagina packed, and given elixir rhamnus Purshiana Co., N. F., teaspoonful t. i. d. In the course of six weeks, some relief from pain. Packing somewhat inefficient from laxity of the vaginal outlet. Cathartic increased to two teaspoonfuls t. i. d., without satisfactory effect. Given faradic current of low tension, with small sacral and abdominal electrodes, twice weekly. After five applications, was able to obtain a daily motion with one teaspoonful of the cathartic three times daily. Bowels have since continued in fair condition under the continued use of the same prescription.

If it be urged, in discussion of these cases, that they have been selected as favorable instances of the value of the current, I must at once plead guilty to the indictment. All cases do not make as favorable a showing as this. These were successful cases, and

selected as an argument in support of the use of electricity, and of the view which I myself personally support warmly, that in properly selected cases it is a therapeutic agent of great efficiency. If in cases which are less fit for its employment it acts less well, and in improper cases does harm, that is no more than must be admitted for every potent therapeutic agent. The use of electricity is an art which must be carefully studied, which requires in its application much care and judgment, and, above all things, an accurate diagnosis of the presence or absence of its contra-indications. I must freely confess that when I first began to use the current, in many of my cases the result was not satisfactory, and I was obliged to discontinue electricity and resort to other means. In one of my early cases, positive harm resulted from an injudicious application of the faradic current of low tension, in the presence of a subacute inflammation; but with increasing experience, the proportion of marked successes has become considerable; the proportion of cases in which I have secured the alleviation of symptoms has become large, while the percentage of unbenefited cases steadily decreases: and I find that as time goes on the proportion of cases in which I use it is steadily though slowly increasing. I cannot help believing that in the hands of well-trained practitioners of intelligence, it is likely to be more and more highly rated year by year.

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